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Guantao Chen, George Davis, Frank Hall* (fhall@mathstat.gsu.edu), **Zhongshan Li, Kinnari Patel** and **Michael Stewart**. *An Interlacing Result on Normalized Laplacians*.

Given a graph G , the normalized Laplacian associated with the graph G , denoted $\mathcal{L}(G)$, was introduced by Fan Chung Graham and has been intensively studied in the last ten years. For a k -regular graph G , the normalized Laplacian $\mathcal{L}(G)$ and the standard Laplacian matrix $L(G)$ satisfy $L(G) = k\mathcal{L}(G)$, and hence, they have the same eigenvectors and their eigenvalues are directly related. However, for an irregular graph G , $\mathcal{L}(G)$ and $L(G)$ behave quite differently, and the normalized Laplacian seems to be more natural. In this talk, Cauchy interlacing type properties of the normalized Laplacian are investigated and the following result is established. Let G be a graph and let $H = G - e$, where e is an edge of G . Let $\lambda_1 \geq \lambda_2 \geq \dots \geq \lambda_n = 0$ be the eigenvalues of $\mathcal{L}(G)$ and let $\theta_1 \geq \theta_2 \geq \dots \geq \theta_n$ be the eigenvalues of $\mathcal{L}(H)$. Then, $\lambda_{k-1} \geq \theta_k \geq \lambda_{k+1}$ for each $k = 1, 2, 3, \dots, n$, where $\lambda_0 = 2$ and $\lambda_{n+1} = 0$. Applications are given for eigenvalues of graphs obtained from special graphs by adding or deleting a few edges, as well as a few other related results. (Received August 04, 2005)